LATERAL AND LONGITUDINAL GRIP VARIATION

David Woodward, Phillip Millar
University of Ulster
and
Campbell Waddell
Findlay Irvine Ltd
This presentation

- Looks at combining the traditional straight line measurement of grip with lateral variation
- Uses data from 2 devices
- Gives some examples
Asphalt / tire / vehicle + time
Why wet grip?
Doing research
NW 200 - road racing in N. Ireland
Difference between dry and wet grip (at 50km/h)
Plotting grip data using GIS

GripMap thresholds

- 0.07000 - 0.40000
- 0.40001 - 0.50000
- 0.50001 - 0.60000
- 0.60001 - 0.70000
- 0.70001 - 0.80000
- 0.80001 - 1.00000
Vehicle properties taken from Racelogic VBox3i
Undergraduate project relating what a kart is doing in relating to grip
High pressure water used to improve race track grip at slippery corners
Huge variation in wet grip around the track in the racing ine
Longitudinal and lateral variations
Measured grip and position
1st attempt to plot GPS grip data using Excel
Much easier using GIS
Short-term variations

23\textsuperscript{rd} January

1\textsuperscript{st} May

6\textsuperscript{th} May

9\textsuperscript{th} May
Same data with differing thresholds
Silverstone F1 track example
Track day at Silverstone
Using frequency distributions to compare tracks

<table>
<thead>
<tr>
<th></th>
<th>0.1 to 0.2</th>
<th>0.2 to 0.3</th>
<th>0.3 to 0.4</th>
<th>0.4 to 0.5</th>
<th>0.5 to 0.6</th>
<th>0.6 to 0.7</th>
<th>0.7 to 0.8</th>
<th>0.8 to 0.9</th>
<th>0.9 to 1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit A</td>
<td>4.2</td>
<td>17.0</td>
<td>31.5</td>
<td>31.7</td>
<td>14.0</td>
<td>1.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit B</td>
<td>0.3</td>
<td>8.0</td>
<td>20.3</td>
<td>29.0</td>
<td>27.8</td>
<td>11.7</td>
<td>2.2</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>Circuit C</td>
<td></td>
<td></td>
<td>0.4</td>
<td>2.1</td>
<td>9.1</td>
<td>39.4</td>
<td>47.5</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Circuit D</td>
<td>0.1</td>
<td>1.9</td>
<td>15.6</td>
<td>22.7</td>
<td>33.4</td>
<td>22.9</td>
<td>3.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit E</td>
<td>0.7</td>
<td>4.8</td>
<td>14.3</td>
<td>24.1</td>
<td>34.5</td>
<td>20.9</td>
<td>0.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
To show the effect of treating slippery corners
Yas Marina F1 track example
Our GripMap – 3 hours work
Yas Marina F1 track

- Abu Dhabi
- $600 million track
- Part of $2 billion Yas Island development
- Wanted best race track in the world
Unpacking the GripTester
Slowest lap and slowest accident
Damage after rolling the GT at 20mph
GripMap / Google Earth overlays
My co-authors
Packing up
Race control
Thankyou